

Date: Tuesday, 09/09/2008 1:24:18 PM
 User: Julie Lecocq

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: 412 X-TUBE INST, LOW NARROW AFT
Job Number	: 41920		
Estimate Number	: 12817		
P.O. Number	:	Part Number	: D412664205
This Issue	: 09/09/2008 S.O. No. :	Drawing Number	: D412-664 -245 REV C
Prsht Rev.	: NC	Project Number	: N/A
First Issue	: / / Type : CROSSTUBES	Drawing Revision	: C
Previous Run	: 38489	Material	:
Written By	:	Due Date	: 22/09/2008 Qty: 1 Um: Each
Checked & Approved By	: <u>JLD 08.9.09</u>		
Comment	: Est Rev:A New Issue 07-04-05 JLM Est Rev:B 08-06-12 add comment in seq. 24 DD verified by:EC		

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	DC	DOCUMENT CONTROL
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Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D412-664-205 CHG001

2.0	PACKAGING 1	PACKAGING RESOURCE #1
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Comment: PACKAGING RESOURCE #1

3.0	D412664205TRN	Crosstube Turning Detail
-----	---------------	--------------------------



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

CROSSTUBE TURNING DETAIL

batch B340548

4.0	BENDING	BENDING MACHINE - SKIDTUBES
-----	---------	-----------------------------



Comment: BENDING MACHINE

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

5.0	QC6	DIMENSIONAL CHECK
-----	-----	-------------------



Comment: DIMENSIONAL CHECK

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Job Number:



Seq. #:

Machine Or Operation:

Description :

6.0

D36061

Cuff



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

CUFF

Batch: 31635

25 08-10-20

7.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill Rivet holes as per Dwg D412-664-245 using DT8972.

2-Drill pilot holes in tube as per Dwg D412-664-245

3-Ream hole to finish size in tube as per Dwg D412-664-245

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-245

25 08-10-20

AWM 8-10-20

8.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat Tube & Cuffs as per QSI 005 4.1

AWM 8-10-22

9.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

5 08/10/22

10.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

5 08/10/22

11.0

OUTSIDE SERV.10

OUTSIDE SERVICES -skids



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038Or

Issue P/O: 7442 LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

08/10/24 ①

W/O:		WORK ORDER CHANGES					
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Drawing Name: 412 X-TUBE INST,LOW NARROW AFT

Job Number: 41920

Part Number: D412664205

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

PC 8/23 (1)

13.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: Inspect for damage & ensure results are as per Dwg D412-664-203

500/6/24 (2)

14.0

CROSSTUBES

CROSSTUBES RESOURCE 1.



Comment: LANDING GEAR RESOURCE 1

1-Rivet Cuffs as per Dwg D412-6647-245. with Sika flex in Between tube & Cuff

A/R SIKAFLEX -241/-291 BATCH: *M 109449*

A.M 08-11-10 (1)

15.0

CR3212407

CHERRY RIVET



Comment: Qty.: 44.0000 Each(s)/Unit Total: 44.0000 Each(s)

CHERRY RIVET

Batch: ~~670510-11~~ *M 109840*

A.M 08-11-10 (1)

16.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

ET 08-11-11

17.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

iml 08-11-12 (1)

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 412 X-TUBE INST,LOW NARROW AFT

Job Number: 41920

Part Number: D412664205

Job Number:



Seq. #:	Machine Or Operation:	Description :
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18.0	D31891	Chafing Shield
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Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

Chafing Shield

Batch: 39736

RT 08-11-12

19.0	D3595063570	RUBBER CUSHION
------	-------------	----------------



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

Rubber Cushion

Batch: 37971

RT 08-11-13

20.0	D28961	Support
------	--------	---------



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D2896-1 Support 33471

RT 08-11-13

21.0	D2856600	Abrasion Strip
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Comment: Qty.: 0.9450 f(s)/Unit Total: 0.9450 f(s)

Abrasion Strip

2 X D2856-600-1009

Batch: 336398

RT 08-11-12

22.0	MS2192028	Clamp(per MIL-DTL-8783C)
------	-----------	--------------------------



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28 Clamp 108847

RT 08-11-12

23.0	MS2192030	clamp(per MIL-DTL-8783C)
------	-----------	--------------------------



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

clamp(per MIL-DTL-8783C)

batch: 106810 107545

RT 08-11-13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Drawing Name: 412 X-TUBE INST,LOW NARROW AFT

Job Number: 41920

Part Number: D412664205

Job Number:



Seq. #:

Machine Or Operation:

Description :

24.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Assemble as per Dwg D412-664-245

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install Chaffing Shields

3-Instal support with magnobond 6398 per dwg D412-664-245, using installaiton jig DT9024 with 0.010 thick brass shims on both chafing sheild (D3189-1).
cure for 12hrs before packaging.

Time & date of application: 2:00 08-11-13

Batch: 108966

ET
08-11-13

25.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

Soslu/14 @

26.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

27.0

AN640A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: M108940

SS 08/11/14 @

28.0

AN641A

Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Bolt

Batch: M107013

SS 08/11/14 @

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 412 X-TUBE INST,LOW NARROW AFT

Job Number: 41920

Part Number: D412664205

Job Number:



Seq. #:

Machine Or Operation:

Description :

29.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total: 6.0000 Each(s)

Nut

Batch:

M108183

SS 08/11/14 (X)

30.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total: 18.0000 Each(s)

Washer

Batch:

M109371

SS 08/11/14 (X)

31.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

SS 08/11/14 (X)

32.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Identify and pack for shipping as per PPP D412-664-105

SP

(19)

33.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08/11/17

Job Completion



MF 08-11-14

D412 664205 B41920

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

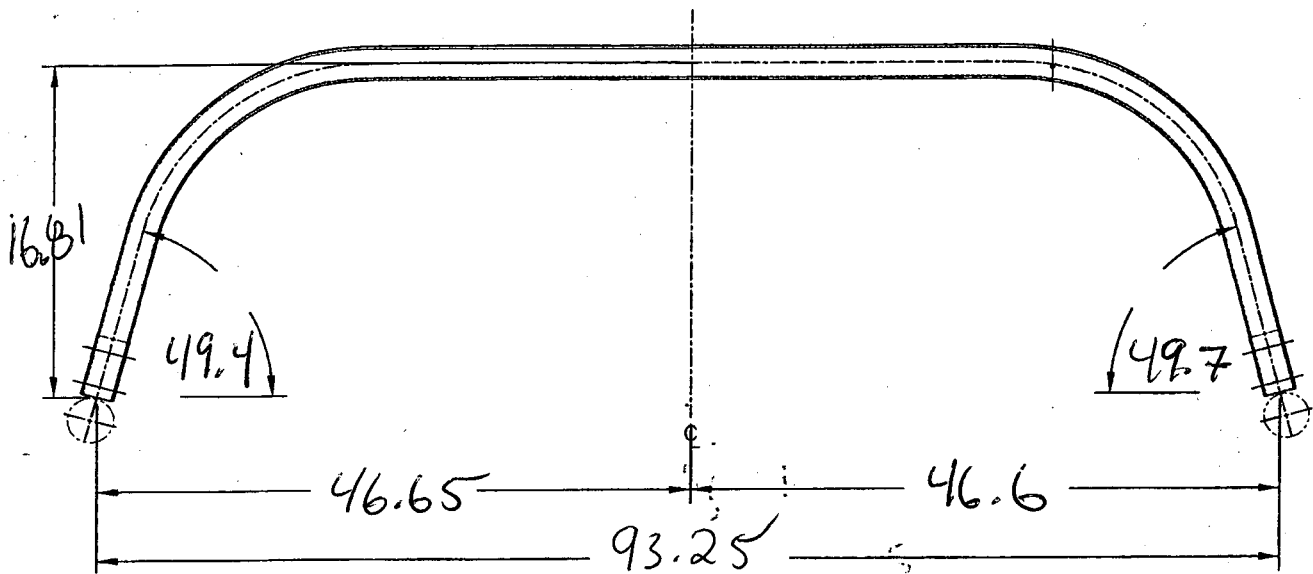
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: 41920
Description: Crosstube Low Narrow Aft (412)		Part Number: D412-664-205
Inspection Dwg: D412-664-245	Rev: C	Page 1 of 1

Required Dimension	Min	Max
Height	16.69	16.95
1/2 Span	46.47	46.73
Angle	49°	52°
Total Span	92.94	93.46



Comments

QC15 Inspection	/ 08-10-16
Date	

Rev	Date	Change	Revised by	Approved
A	07.04.27	New Issue	KJ/JM	<i>[Signature]</i>

DART

DESIGN <i>qp</i>	DRAWN BY <i>qp</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D412-664-245	REV. C SHEET 1 OF 3
DATE 07.03.29		TITLE CROSSTUBE ASS'Y (412 LOW-N AFT) NTS	
A	06.12.01	NEW ISSUE	
B	07.03.01	CHG CUFF AREA, CHG RUBBER CUSHION	
C	07.03.29	CHG RIVET AND RUBBER CUSHION	

RELEASED07.04.24 *[Signature]***PARTS LIST:**

Qty	Part Number	Description
X	D412-664-245	CROSSTUBE ASSEMBLY (412 LOW-NARROW AFT)
1	D6009-129	CROSSTUBE
2	D2856-600-1009	ABRASION STRIP
1	D2896-1	SUPPORT
2	D3189-1	CHAFING SHIELD
2	D3595-063-570	RUBBER CUSHION
2	D3606-1	CUFF
44	CR3212-4-07	RIVET (OR M7885/3-4-07)
4	MS21920-28	CLAMP
2	MS21920-30	CLAMP (OR MS21920-32)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 123.59±0.020 (BEFORE BENDING/TRIMMING)
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3606-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

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WITHOUT NOTICE

WORK ORDER

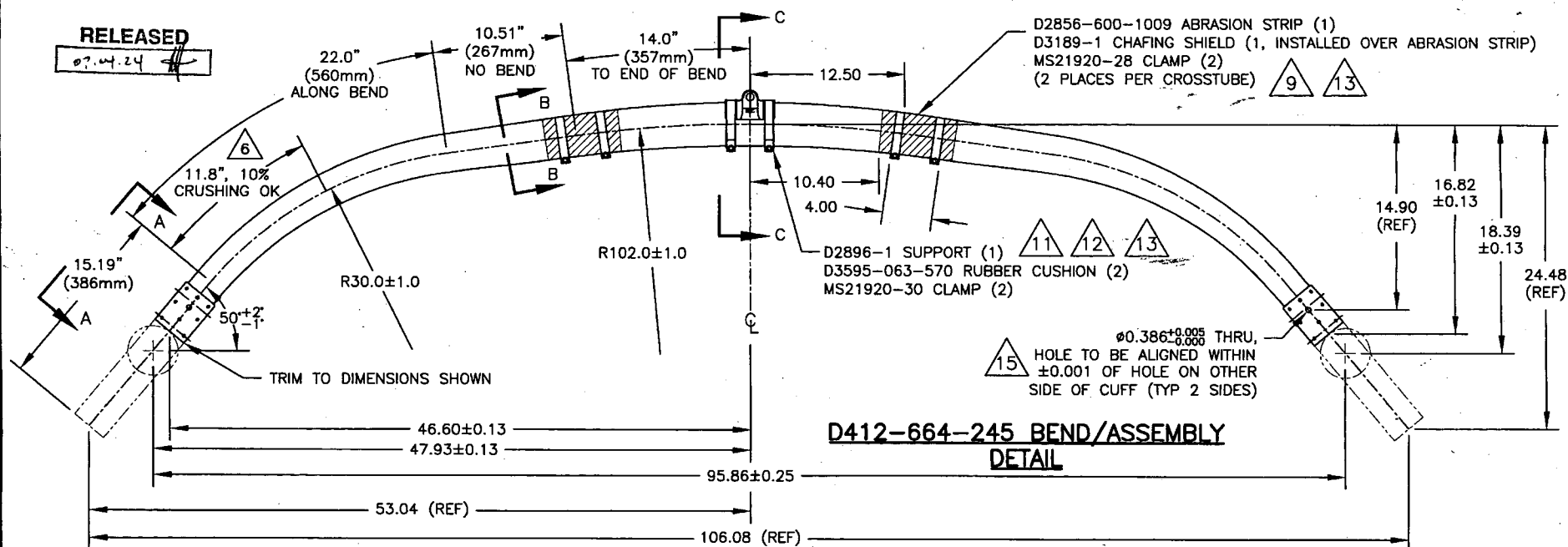
NO. 41920

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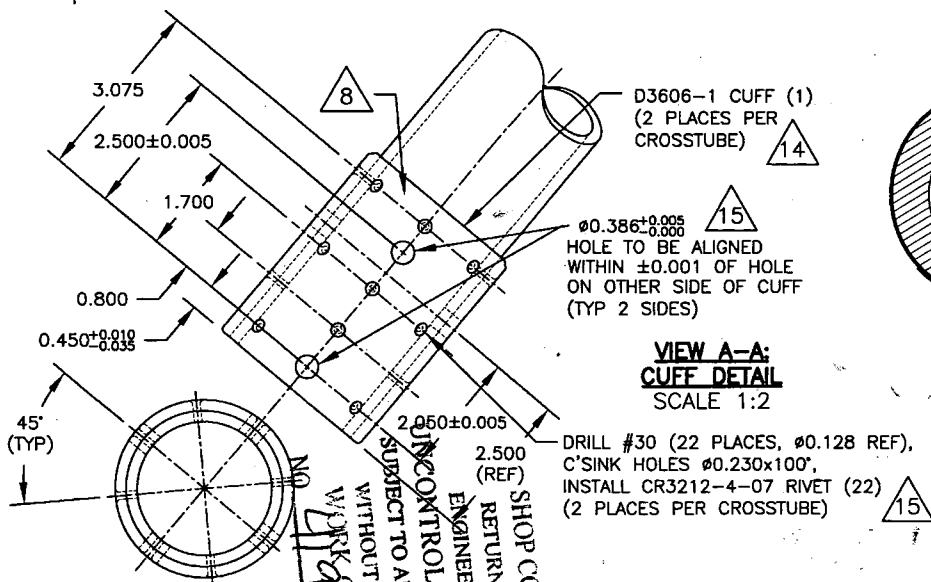
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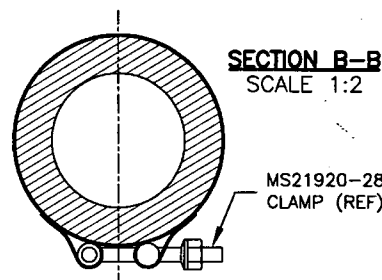
07.04.24



**D412-664-245 BEND/ASSEMBLY
DETAIL**



**VIEW A-A:
CUFF DETAIL
SCALE 1:2**



**SECTION B-B
SCALE 1:2**

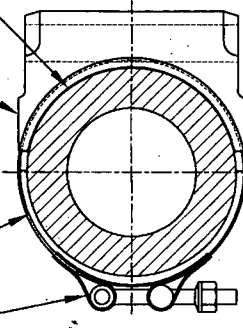
APPLY MAGNOBOND
BETWEEN D2896-1 AND
THE CROSSTUBE

D2896-1
SUPPORT
(REF)

D3595-063-570
RUBBER CUSHION
(UNDER CLAMP, REF)

MS21920-30
CLAMP (REF)

**SECTION C-C
SCALE 1:2**



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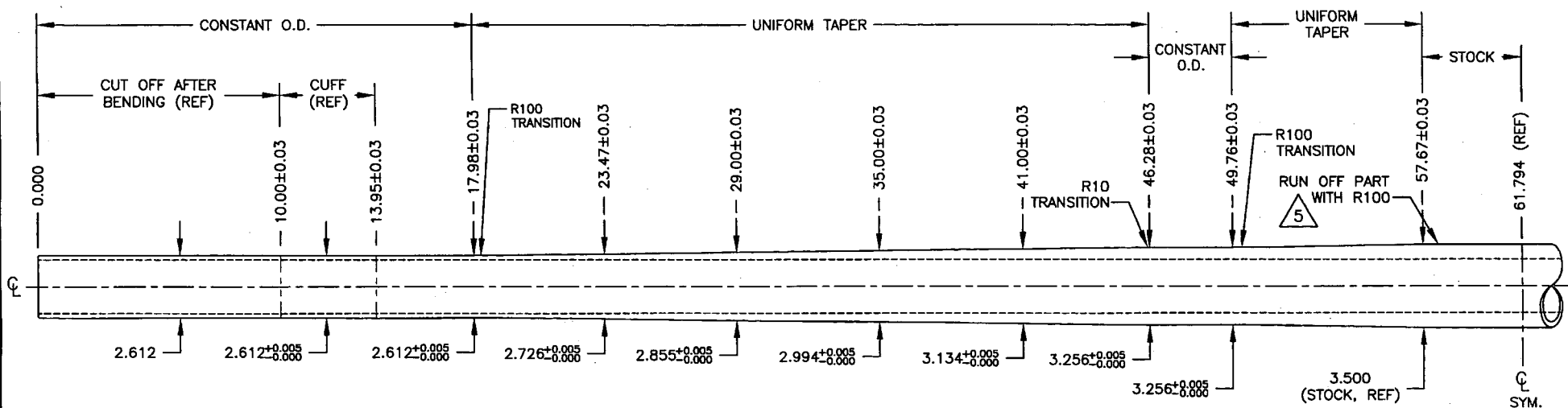
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DESIGN
9P
CHECKED
DATE
07.03.29

DRAWN BY
9P
APPROVED
DATE

DART DART AEROSPACE LTD.
HAMPSHIRE, ENGLAND, UNITED KINGDOM
DRAWING NO.
D412-664-245
TITLE
CROSSTUBE (412 LOW-NARROW AFT)
REV. C
SHEET 2 OF 3
SCALE
1:8

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WORK
ORDER
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D412-664-245 MACHINING DETAIL

RELEASED

07.04.19

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WORK ORDER
NO. 41220

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DATE 07.03.29		TITLE CROSSTUBE (412 LOW-NARROW AFT)		SCALE 1:4	

